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THE INTERCONTINENTAL RAILWAY.

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THE scheme for an intercontinental railway has elements of fascination. The idea of a railway, built for the avowed purpose of connecting the capitals of the fifteen nations of the three Americas, seizes the imagination, for it belongs to that class of large-sounding and inclusive schemes another of which is the parliament of the nations to preserve the peace of the world.

Thus far, everybody is in favor of the railway. The time for contributions to finance the scheme has not arrived. This is, furthermore, a time when engineering feats have so nearly approached the miraculous that one of the world's greatest engineers may be pardoned for his recent statement that, given money enough and time enough, nothing is impossible.

This certainly includes the Intercontinental Railway, but there is a great difference between what is possible and what is feasible; and, in the writer's opinion, it is the neglect to give proper weight to this difference which has caused this railway scheme to be heralded as belonging to the practical class.

It was surveyed in 1891-93, as a result of Mr. Blaine's first Pan-American Congress. It is most natural that that body should have favored it. It could, indeed, scarcely have been otherwise. A Pan-American Congress can develop much enthusiasm over the scheme. Representation and voting are by nations, and most of the nations, having a meagre supply of railways, and a yet more meagre supply of funds, see a possibility of having their lands developed by a railway built by outside interests. Such desire resides in all communities.

New industries are always welcomed. Enthusiasm among the people to be benefited by a railway is not the surest guarantee of its early construction. A better guarantee of this is to be found among those who must furnish the funds.

The writer happens to own an abandoned farm on which he occasionally seeks summer repose. The farm cost nearly four dollars an acre, buildings included. If the warring interests of Goulds and Vanderbilts should find that that tract of land appeared to be necessary for some transcontinental scheme, the prospect of their paying about a hundred dollars an acre for part of it, and putting a town on the rest, would probably develop on the part of its owner some enthusiasm for the new railway. By the same reasoning, it is easy to see why a practically bankrupt Spanish-American nation should favor the railway project at Pan-American Congresses. The population of the nation probably comprises a few hundred thousand people, of whom the overwhelming majority are illiterate Indians and half-breeds. They have practically no capital, the building of several hundred miles of very expensive railway would employ the available labor for years, and the consequent expenditure of millions of good international gold would produce cheerfully trickling streams of commerce in the place of the present stagnation.

The first thing to be done by any set of railway promoters is to examine into the traffic possibilities of the proposed route, and, before proceeding with the expenditure of capital, to assure themselves that there will be sufficient employment to enable it to earn adequate returns.

The idea of an intercontinental railway has the necessary counterpart of intercontinental traffic for it to carry, or there is no use for the completed road. Unless the traffic between South America and North America would use such a railway, it would be a shameful waste of money to complete the road; and the writer of this paper claims that there is practically no traffic future for such a road under any conditions now discernible.

Such a prediction about proposed enterprises is not new. It has been made about each of our transcontinental roads in turn, and yet they have eclipsed even the most roseate hopes of their ardent champions. Their success has come about by the unexpected development along their lines of industry and traffic which no other agency could transport. The essential difference between these roads and the Pan-American is the fact that increase of industry along the line of the latter does not make through-freight for it. That will be carried down to the sea by a hundred little local railways and transported in ships.

Before the railway could be graded, the Panama Canal will probably be open to the shipping of the world. The problem then becomes one of competition between a water route and a land route, with all the handicaps on the land route.

An examination of an accurate map shows how hopelessly the railway route is distanced as a connection between New York or Washington and any South-American capital. Strange to say, the west coast of South America is practically a continuation in longitude of the east coast of the United States. The longitude of New York is the longitude of Peru, and Chile actually lies to the east of the American metropolis. The Gulf of Mexico penetrates fully half the width of the northern continent, and the land route must circle around it. The proposed intercontinental trunk line from the United States enters Mexico at Laredo, a point west of Chicago, west of the Missouri River, even west of Topeka, Kansas; and then the line must gradually work its way eastward again through Mexico, Central America and the Isthmus of Panama to the longitude of New York. In bold outline, the proposed railway route from New York to Peru has the suggestive shape of a huge reversed question-mark. In addition to this bold continental curve, we must consider the thousands of local deviations necessary to the fitting of a railway line to the inequalities of the rough land surface. In amazing contrast to this is the almost straight line by which a ship will drop down the longitude from New York to western South America, which will actually become as near as Europe. Brought down to figures, these are the distances: from New York to Guayaquil, the port of Ecuador, by railway about 6,500 miles, by the Panama Canal 2,864; to Callao, the port of Lima, the adjacent capital of Peru, by rail, about 7,600 miles, by Panama Canal 3,359 miles. A little thinking on these figures shows the utter hopelessness and uselessness of the railway as a through carrier for anything but the leisurely traveller who, in search of novelty, might happen to fancy such a route.

The railway is superior to the ocean as a means of transport in one respect—speed. There is always a certain amount of traffic that will go by the quickest route, regardless of cost; as a consequence, railroads can thrive in populous regions with waterways alongside. Such lines as the Trans-Siberian and the American Transcontinental roads can get through traffic because the competing sea routes are much longer and slower. Yet the sea routes, though longer, have their place, for they are cheaper for the user. A vast traffic can afford to go no other way, or can at least make a profit by taking the longer and slower route. Witness, in proof of the truth of this statement, the great procession of steamers from Chicago to Buffalo. These two ports are connected over a nearly straight level route by a dozen railway tracks less than two-thirds as long as the water route, yet the water route prospers, and the people of New York have decided to expend a hundred millions of dollars to continue it to the Hudson, although even that expenditure will only give a canal floating a barge one-tenth as capacious as a good lake or ocean steamer. Because of this fundamental factor of cheapness in water transportation, our ever-increasing and prosperous continental railways have not lessened the demand of the American people for the cheaper but slower Panama Canal route.

But, while the canal route from New York to Ecuador and Peru is cheaper than the rail route, the overwhelming part of the argument is that it is so much shorter than the rail route that it will be also quicker. The route possessing the dual advantages of cheapness and speed is economically unassailable.

Inasmuch as neither route is complete, proof should follow this statement of sea advantages, and in this proof present actualities should receive due consideration. Present practice gives small promise for the future railway. It is true that an express-train can run nearly three times as fast as a steamship, but there is a great difference between the express-train speed that can be made on a trunk-line railroad in the eastern United States or on the Great Plains and on such a new mountain road as most of the Pan-American will be. The famous Trans-Siberian is again open to travellers. It amazed the world by its traffic performance under an American trained man during the Japanese War, and a well-known agency is now offering to put tourists through with continuous run in sleeping-cars from Moscow to Vladivostok, 5,261, miles, in fourteen days, if the train is on time. Freight-trains would probably be slower than a sleeping-car express. Such are the delays of freight-trains, shiftings and freight-yards, that it takes about three weeks for goods to cross the American continent under the best calculations; and on the main lines of the Pennsylvania and of the Baltimore and Ohio railroads, on the level plain from Philadelphia to Baltimore, the freight-steamer that goes poking through the canal by night insures quicker delivery than do the railroads, because the boats always go from wharf to wharf overnight, and the freight-cars sometimes get delayed in the yards.

We have some exceedingly instructive comparisons on the Pan-American route which this railway proposes to serve and aid. The steamship line from New York to Colon makes the mail time from New York to that port, 1,920 miles, between six and seven days. To the City of Mexico (by rail) it is five days—the distance, 2,989 miles—over American railways that were built for commercial purposes over comparatively level country. That leaves the Pan-American railway but a day and a half in which to overtake the steamers at Panama, and in that day and a half it must pass over 2,100 miles of jungle, swamp, mountain and plain—a clearly impossible feat for a day and a half. Yet the innocent victor in this race, the Panama steamship line, is not noted as a speedy one. If the traffic required it, there would be little difficulty in raising the speed to that of second-class trans-Atlantic steamers and cutting the time down to five days, the same as the railway mail time to Mexico City, 2,100 miles to the northwest.

The rather startling discovery has recently been made that, of the ten-thousand-odd miles of railway needed to connect New York and Buenos Ayres, nearly two-thirds were already completed in the various links now existing in the thirteen countries *en route*. Laying aside for a moment all questions of distance, the character of the uncompleted links is forbidding in the extreme.

Every one of these is either thoroughly tropical or thoroughly mountainous. Some of them maintain both of these characteristics, and several are covered by tropic forest, jungle and swamp. For this latter class of difficulties, the history of enterprises at Panama is a great teacher. The Panama railway is forty-seven miles long, and cost eight million dollars ($170,000 per mile). No one knows the number of lives that this railway cost. In sixty days an importation of Chinese coolies was reduced from a working force of 1,000 to 200. Present sanitary knowledge has made such conditions unlikely for the future, but the occurrence is not the less suggestive. According to geographers, this is not the worst part of the Isthmus. In the Choco, a region farther east, where the Isthmus bends around toward South America, it is declared that it rains almost continuously. The experience of the Intercontinental Railway commission's surveying corps there was interesting. The forests and jungles were so thick that the commission proceeded in a sail-boat from Panama to the Gulf of San Miguel, 110 miles east. Streams flowing into this body of water from the east and west were ascended as far as possible; and then, desiring to get into the basin of the Atrato, seventy-five miles away in Colombia, the corps discreetly declined to attack a trackless wild, but decided upon a flank movement. They sailed back to Panama, crossed to Colon, took a European steamer to Cartagena, three hundred miles east on the Colombian coast, and came back to the Atrato in a coasting steamer.

This is not narrated in criticism of the surveying corps. They were a plucky group. I have rarely read more heroic tales than their account of that survey; but they had a certain ground to cover and a limited amount of time and money, and their survey of the Panama region, with its difficulties, had to be more theoretical than real. And Panama stretches its weary length for six hundred and twelve miles, according to the survey, and the same physical conditions reach over into Colombia for two hundred miles more before reaching the uplands of Colombia. The deep and swamp-flanked Atrato River must also be crossed here.

Another physical drawback is found in the fact that the unconstructed road must run for most of its length across drainage systems. Any one who has either looked out of car windows in travelling or has examined on maps the location of railways has observed that it is the custom for the railway in a hilly land to follow streams. This is as true for the Altai or the Alps as it is for the Appalachians or Rockies. The railway that crosses the mountains follows up the natural incline made by a stream eroding its valley, and, passing through a gap, goes down the other side in like manner. Such is the method of our Rocky Mountain roads. But from Mexico to Argentina the proposed Pan-American route must go parallel to the ocean and parallel to the mountain ranges in a region that is usually mountainous, and the road-bed must be carried most of the distance across the continuous succession of valleys made by the streams running from the mountains to the sea. Two alternatives exist. Uneven surface may be avoided by following the shore plain. This has the disadvantage of crossing the streams where they are large, requiring much expense for bridges. These plains close to the sea are usually sparsely peopled in comparison with the upland, are often marshy and are subject to flood. A twenty-four-hour shower visited one of the camps of an Isthmian Canal Commission surveying corps in Nicaragua in 1899, and during its progress twenty-three inches of rain fell. The Chagres River in Panama, the great problem of the canal-builders, has been known to rise fifty feet in a few hours. These are suggestive facts for the coast-swamp railroad builder.

The other alternative in track location is to follow the plateau where the population is centred, and cross the streams where they produce a succession of deep valleys and sharp intervening ridges. In Central America, the route selected is usually near the shore. In most of Colombia it has the good fortune to follow the longitudinal valleys between the Andean ranges; but, when the Ecuadorian boundary is reached, a shore-plain route is so palpably useless that the survey commission boldly essayed a chaos of mountains in the mighty Andes. This system already possesses the highest railroad track in the world, not excepting the cog-wheel climbers of Pike's Peak and the Alps. The building of eighty-six miles of the Oroya line in the Peruvian mountains cost twenty-seven million dollars, three hundred thousand dollars a mile, and the lives of seven thousand men. This is about enough men to conquer all Europe if the battle losses of the Spanish war should be taken as a true guide.

The proposed twenty-four hundred miles through Ecuador and Peru are through a region unique among mountains. The Andean system here consists of two or more huge ranges, with intervening valleys cut up by cross-ranges which connect the main ranges as the rungs of a ladder connect the uprights. These intervening short valleys are drained by streams breaking through the main ranges and flowing off to the Atlantic and Pacific oceans. The track must climb from river system to river system over these cross-ranges. In Ecuador alone the continental divide is crossed by the projected line so often that the road is divided into ten parts, four of them draining to the Pacific and six into the Atlantic. In 500 miles of proposed Ecuadorian location to the south of Quito the elevations of these continental divides are as follows, and the accompanying table shows the intervening depth to which the track sinks:

Divides.	Valleys.	Difference
11,540	8,604	2,936
10,813	7,632	3,181
10,888	8,100	2,788
9,370	7,100	2,270
10,080	7,138	2,942
8,250	5,476	2,774
9,390	3,000	6,390

Intervening spurs are also often crossed between these continental divides, making the actual climbing much greater than the difference-table indicates. But the grand engineering prize of the whole system should probably be withheld for the builder of the link that is planned to connect the railway from Lima with the one to the Lake Titicaca basin. This line is badly entangled with the head streams of the Amazon system. The 1,338th mile south from Quito has an elevation of 14,715 feet; fourteen miles beyond is a river at 5,759; twenty-two miles farther is another ridge of 12,900, and the next stream is 6,050. It is not surprising that the thirty-six miles of distance between those two ridges becomes ninety-two as the track is planned to make the 16,000 feet of descent and ascent from ridges to stream. In addition, also, are minor grades across minor ridges. This region is only to be classed with the Grand Cañon of the Colorado. The ninety-two miles of road are an endless climb along the precipitous sides of the sharp and unpeopled valleys, bridging a succession of gullies, chasms and gorges. At one place, a single straight line on the map will cross the track thirteen times as it bends and twists upon itself and winds and burrows in the earth in the wild endeavor to cross a cañon four miles wide where the stream has an elevation of 6,000 feet, and one bank 7,000 and the other 10,500 feet.*

In comparison with this particular Andean specimen, and it is only a specimen, the crossing of the Alps and Rockies seems like child's play. The St. Gothard pass is 6,936 feet above the sea, Great Bernard 8,110 feet, Simplon 6,590, the Brenner 4,490. The plain on the north side of the Alps is about 2,000 feet altitude, and but one of the Alpine passes has a railroad through it, although there are several tunnels; yet this one Peruvian Cordillera, with no particular name, imposes upon the Pan-American builder a climb higher than from the sea-level to the highest of the Great Alpine passes. The Rocky Mountain railroads start from a plateau which reduces their greatest climbing to two-thirds, and usually much less than two-thirds, of that required by the nameless Cordillera of Peru.

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* Those persons wishing to examine the detail maps are referred to maps 45 and 46, Report of Corps 3, Intercontinental Railway Commission.

The Pan-American railway, as planned with its double switchbacks, its corkscrew tunnels and flying bridges, probably calls for more mountain-climbing than all the railroads of the Rockies or the Alps, and may equal the two combined. Time and again, it must overtop Pike's Peak. It passes for hundreds of miles along the face of steep mountain slopes—an ideal location for rockfalls and landslides, avalanches and washouts. It runs also through jungle, swamp and flooded plain lands empty and uninhabitable, and from the economic standpoint more forbidding than Sahara. As a through carrier between the North and South, it will have to compete with the majestic steamer proceeding at will, and but half as far, over the toll-less and peaceful Pacific, with but a twelve-hour delay at Panama, and then onward over the well-known tracks to New Orleans or New York.

It is claimed that the road should be built, anyhow, for local need. Much of it should be built for this purpose; but it must be remembered that the prime transport need of this whole region, from Mexico southward, is for the railroads to go on as they have begun and multiply the already numerous small lines that run from a port directly inland, and give the land as soon as possible the priceless and unrivalled boon of water transportation. For a thousand miles of road in the region of Panama, and another thousand in the defiles and plateaus of Peru, there is no need for local traffic.

There is not even the call for local trade from country to country *en route*. There would of course be some travel, but goods are exchanged between regions having differences in production. The economic sameness of the Spanish-American countries is amazing—in the highlands minerals, hides and wool, in the lowlands coffee and the same round of tropical produce. Each Central-American country is like its neighbor, and all are like the adjacent parts of Mexico. Ecuador, Peru and Bolivia are as much alike as Colorado, Wyoming and Montana, and among them they produce nothing of importance that is not also produced in Central America. The great natural basis for trade on this route is in the exchange of the products of temperate North America and the tropics, especially South America, and for this exchange the sea will apparently always suffice. This road proposes to make the Isthmus an economic connecter of the two continents. It is really much in the way. It is a commercial hindrance, not a commercial link; it has, from its discovery in 1519, been so regarded, and the American nation is now wisely engaged in spending two hundred millions of treasure to tear a shipway through it.

Might the Pan-American railway save the continent, in case a clash of arms had arisen over the Monroe Doctrine? The road would certainly be of no use before we lost control of the seas, and it would be equally useless afterward, for its defence would be impossible. The part of it on foreign soil is longer than the Trans-Siberian Railway.

No warfare could be much simpler than for parties of marines to land and break the track somewhere, indeed almost anywhere, between the boundaries of Mexico and Peru. In places, it could be successfully bombarded from war-ships and gunboats.

There appears to be little real reason to anticipate investment for the complete Pan-American railway either by private capital, by the United States Government, or by the countries to be traversed by the proposed line.

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